Hydrocarbon Processing©

Annual Editorial Index 1993

Volume 72, Nos. 1–12

A

ABSORPTION
Etherify field butanes, Part 1 .. Jan. 89
Etherify field butanes, Part 2 .. Feb. 43
Etherify light gasolines ..... Feb. 53
FCC main fractionator revamps ..... Mar. 77
How to design baffle tray columns ..... May 75
Recover additional distillate from vacuum residue ..... Jul. 75
Troubleshoot vacuum columns with low-capital methods ... Jul. 81
Use Ponchon-Savarit in your process simulation, Part 1 ..... Sep. 41
Predict AGO quality ..... Sep. 47
Distillation feed preheat—is it energy efficient? ..... Oct. 37
Use Ponchon-Savarit in your process simulation, Part 2 ..... Oct. 63
Modeling of tower relief dynamics, Part 1 ..... Oct. 71
Revamping FCC main fractionator energy systems ..... Nov. 43
Statistical safety factors reduce overdesign ..... Nov. 77
Easy characterization of petroleum fractions, Part 1 ..... Dec. 101

ACID GASES
Etherify light gasolines ..... Feb. 53
Compute dew point of acid gases ..... Feb. 93
Improve methanol synthesis ... Mar. 89
Sour natural gas drying ..... Apr. 67
Understanding corrosion in alkanolamine gas treating plants, Part 1 ..... Apr. 75
Understanding corrosion in alkanolamine gas treating plants, Part 2 ..... May 89
Proven technologies manage olefin plant's spent caustic ..... Sep. 61

ACTIVATED CARBON
Design more flexibility into wastewater treatment ..... Dec. 81

ADSORPTION
Sour natural gas drying ..... Apr. 67
Design more flexibility into wastewater treatment ..... Dec. 81

ALCOHOLS
Etherify field butanes, Part 1 .. Jan. 89
Etherify field butanes, Part 2 .. Feb. 43
Etherify light gasolines ..... Feb. 53
Industrial hydrogenation of aldehydes ..... Mar. 67
Improve methanol synthesis ... Mar. 89

ALDEHYDES
Industrial hydrogenation of aldehydes ..... Mar. 67

ALKYLATION
Etherify light gasolines ..... Feb. 53

ALLOYS see METALS

AMINES
Understanding corrosion in alkanolamine gas treating plants, Part 1 ..... Apr. 75
Understanding corrosion in alkanolamine gas treating plants, Part 2 ..... May 89

ANALYZING see INSTRUMENTATION

ANTIKNOCK RATING
Etherify light gasolines ..... Feb. 53

AROMATICS
Hydrotreating catalysts for diesel aromatics saturation ..... Jun. 83

AZEOTROPES
Etherify field butanes, Part 1 .. Jan. 89
Etherify field butanes, Part 2 .. Feb. 43

B

BOILING POINT
Predict AGO quality ..... Sep. 47

BUTENES AND BUTENE COMPOUNDS see OLEFINS

C

CATALYSTS
Etherify field butanes, Part 1 ... Jan. 89
Etherify field butanes, Part 2 ... Feb. 43
Etherify light gasolines ..... Feb. 53
Industrial hydrogenation of aldehydes ..... Mar. 67
Improve methanol synthesis ... Mar. 89
Hydrotreating catalysts for diesel aromatics saturation ..... Jun. 83
Reforming using erionite catalysts ..... Aug. 165
Increasing FCC regenerator catalyst level ..... Nov. 59

CATALYTIC CRACKING
Etherify field butanes, Part 1 ... Jan. 89
Etherify field butanes, Part 2 ... Feb. 43
Etherify light gasolines ..... Feb. 53
FCC main fractionator revamps ..... Mar. 77
FCCU advanced control and optimization ..... Apr. 107
Increasing FCC regenerator catalyst level ..... Nov. 59
Bottom-of-the-barrel upgrading moves aggressively ..... Dec. 100C

COALESCER
Improve suspended water removal from fuels ..... Dec. 95

COKING
Bottom-of-the-barrel upgrading moves aggressively ..... Dec. 100C

COMPRESSORS
FCC main fractionator revamps ..... Mar. 77

COMPUTERS
Improve process analyzer availability ..... Jan. 69
Include heuristics in protection systems ..... Feb. 79
On-line optimal NGL recovery in lean oil plants ..... Apr. 55
Hydrogen membrane recovery estimates ..... Apr. 61
FCCU advanced control and optimization ..... Apr. 107
Information system master planning ..... May 45
Computer integrated manufacturing/processing in the HPI ..... May 65
How to justify small-refinery info/control system modernization ..... May 69
Polyethylene reactor modeling and control design ..... Jun. 119
Manage costs in real time ..... Jul. 41
Simplify fuzzy controller implementation ..... Jul. 49
Assessing your competitors' application of CIM/CIP ..... Jul. 57
Benefits of standardized advanced controls ..... Jul. 63
Process optimization in the HPI ..... Jul. 69
Delayed coker fractionator advanced control ..... Aug. 173
Advanced process control strategies '93 ..... Sep. 77
Take an integrated approach to refinery automation ..... Sep. 155
BASIC program calculates flue gas energy balance ..... Oct. 47
Improve prediction with data reconciliation ..... Oct. 79
RCU optimization in a DCS gives fast payback ..... Oct. 85
Integrate offsites management with information systems .... Nov. 63
Fieldbus: How a worldwide standard will benefit the HPI ..... Dec. 107

CONSTRUCTION
Streamline fast-track projects ..... May 116C

CONSTRUCTION BOXSCORE ..... Feb., Jun., Oct.

Hydrocarbon Processing©

Annual Editorial Index 1993

Volume 72, Nos. 1–12

A

ABSORPTION
Etherify field butanes, Part 1 .. Jan. 89
Etherify field butanes, Part 2 .. Feb. 43
Etherify light gasolines ..... Feb. 53
FCC main fractionator revamps ..... Mar. 77
How to design baffle tray columns ..... May 75
Recover additional distillate from vacuum residue ..... Jul. 75
Troubleshoot vacuum columns with low-capital methods ... Jul. 81
Use Ponchon-Savarit in your process simulation, Part 1 ..... Sep. 41
Predict AGO quality ..... Sep. 47
Distillation feed preheat—is it energy efficient? ..... Oct. 37
Use Ponchon-Savarit in your process simulation, Part 2 ..... Oct. 63
Modeling of tower relief dynamics, Part 1 ..... Oct. 71
Revamping FCC main fractionator energy systems ..... Nov. 43
Statistical safety factors reduce overdesign ..... Nov. 77
Easy characterization of petroleum fractions, Part 1 ..... Dec. 101

ACID GASES
Etherify light gasolines ..... Feb. 53
Compute dew point of acid gases ..... Feb. 93
Improve methanol synthesis ... Mar. 89
Sour natural gas drying ..... Apr. 67
Understanding corrosion in alkanolamine gas treating plants, Part 1 ..... Apr. 75
Understanding corrosion in alkanolamine gas treating plants, Part 2 ..... May 89
Proven technologies manage olefin plant's spent caustic ..... Sep. 61

ACTIVATED CARBON
Design more flexibility into wastewater treatment ..... Dec. 81

ADSORPTION
Sour natural gas drying ..... Apr. 67
Design more flexibility into wastewater treatment ..... Dec. 81

ALCOHOLS
Etherify field butanes, Part 1 .. Jan. 89
Etherify field butanes, Part 2 .. Feb. 43
Etherify light gasolines ..... Feb. 53
Industrial hydrogenation of aldehydes ..... Mar. 67
Improve methanol synthesis ... Mar. 89

ALDEHYDES
Industrial hydrogenation of aldehydes ..... Mar. 67

ALKYLATION
Etherify light gasolines ..... Feb. 53

ALLOYS see METALS

AMINES
Understanding corrosion in alkanolamine gas treating plants, Part 1 ..... Apr. 75
Understanding corrosion in alkanolamine gas treating plants, Part 2 ..... May 89

ANALYZING see INSTRUMENTATION

ANTIKNOCK RATING
Etherify light gasolines ..... Feb. 53

AROMATICS
Hydrotreating catalysts for diesel aromatics saturation ..... Jun. 83

AZEOTROPES
Etherify field butanes, Part 1 .. Jan. 89
Etherify field butanes, Part 2 .. Feb. 43

B

BOILING POINT
Predict AGO quality ..... Sep. 47

BUTENES AND BUTENE COMPOUNDS see OLEFINS

C

CATALYSTS
Etherify field butanes, Part 1 ... Jan. 89
Etherify field butanes, Part 2 ... Feb. 43
Etherify light gasolines ..... Feb. 53
Industrial hydrogenation of aldehydes ..... Mar. 67
Improve methanol synthesis ... Mar. 89
Hydrotreating catalysts for diesel aromatics saturation ..... Jun. 83
Reforming using erionite catalysts ..... Aug. 165
Increasing FCC regenerator catalyst level ..... Nov. 59

CATALYTIC CRACKING
Etherify field butanes, Part 1 ... Jan. 89
Etherify field butanes, Part 2 ... Feb. 43
Etherify light gasolines ..... Feb. 53
FCC main fractionator revamps ..... Mar. 77
FCCU advanced control and optimization ..... Apr. 107
Increasing FCC regenerator catalyst level ..... Nov. 59
Bottom-of-the-barrel upgrading moves aggressively ..... Dec. 100C

COALESCER
Improve suspended water removal from fuels ..... Dec. 95

COKING
Bottom-of-the-barrel upgrading moves aggressively ..... Dec. 100C

COMPRESSORS
FCC main fractionator revamps ..... Mar. 77

COMPUTERS
Improve process analyzer availability ..... Jan. 69
Include heuristics in protection systems ..... Feb. 79
On-line optimal NGL recovery in lean oil plants ..... Apr. 55
Hydrogen membrane recovery estimates ..... Apr. 61
FCCU advanced control and optimization ..... Apr. 107
Information system master planning ..... May 45
Computer integrated manufacturing/processing in the HPI ..... May 65
How to justify small-refinery info/control system modernization ..... May 69
Polyethylene reactor modeling and control design ..... Jun. 119
Manage costs in real time ..... Jul. 41
Simplify fuzzy controller implementation ..... Jul. 49
Assessing your competitors' application of CIM/CIP ..... Jul. 57
Benefits of standardized advanced controls ..... Jul. 63
Process optimization in the HPI ..... Jul. 69
Delayed coker fractionator advanced control ..... Aug. 173
Advanced process control strategies '93 ..... Sep. 77
Take an integrated approach to refinery automation ..... Sep. 155
BASIC program calculates flue gas energy balance ..... Oct. 47
Improve prediction with data reconciliation ..... Oct. 79
RCU optimization in a DCS gives fast payback ..... Oct. 85
Integrate offsites management with information systems .... Nov. 63
Fieldbus: How a worldwide standard will benefit the HPI ..... Dec. 107

CONSTRUCTION
Streamline fast-track projects ..... May 116C

CONSTRUCTION BOXSCORE ..... Feb., Jun., Oct.

CONSTRUCTION EQUIPMENT
Create better construction subcontract bid packages ... Mar. 102J

CORROSION
Avoid H_2S corrosion in refinery vessels ... Jan. 103
Understanding corrosion in alkanolamine gas treating plants, Part 1 ... Apr. 75
Understanding corrosion in alkanolamine gas treating plants, Part 2 ... May 89
Improve suspended water removal from fuels ... Dec. 95

COSTS
Cogeneration refinery for total residue destruction ... Nov. 52
Forecasting oil trends: mirror or telescope? ... Nov. 148J
Rapid method for capital investment decisions ... Dec. 132

CRACKING/CHEMICAL see also CATALYTIC CRACKING; COKING; HYDROCRACKING
Etherify field butanes, Part 1 ... Jan. 89
Etherify field butanes, Part 2 ... Feb. 43
Etherify light gasolines ... Feb. 53
FCC main fractionator revamps ... Mar. 77
FCCU advanced control and optimization ... Apr. 107
Increasing FCC regenerator catalyst level ... Nov. 59
Bottom-of-the-barrel upgrading moves aggressively ... Dec. 100C

CRUDE OILS
Heavy oil viscosity range from one test ... Aug. 157
Predict AGO quality ... Sep. 47
Easy characterization of petroleum fractions, Part 1 ... Dec. 101

D

DEHYDROGENATION
Etherify field butanes, Part 1 ... Jan. 89
Etherify field butanes, Part 2 ... Feb. 43
Etherify light gasolines ... Feb. 53

DESULFURIZATION
Residual fuels in a clean-fuels environment ... Jun. 82B
Cogeneration refinery for total residue destruction ... Nov. 52

DISTILLATION
Etherify field butanes, Part 1 ... Jan. 89
Etherify field butanes, Part 2 ... Feb. 43
Etherify light gasolines ... Feb. 53
FCC main fractionator revamps ... Mar. 77
How to design baffle tray columns ... May 75
Recover additional distillate from vacuum residue ... Jul. 75
Troubleshoot vacuum columns with low-capital methods ... Jul. 81
Use Ponchon-Savarit in your process simulation, Part 1 ... Sep. 41
Predict AGO quality ... Sep. 47
Distillation feed preheat—is it energy efficient? ... Oct. 37
Use Ponchon-Savarit in your process simulation, Part 2 ... Oct. 63
Modeling of tower relief dynamics, Part 1 ... Oct. 71
Revamping FCC main fractionator energy systems ... Nov. 43
Modeling of tower relief dynamics, Part 2 ... Nov. 69
Statistical safety factors reduce overdesign ... Nov. 77
Easy characterization of petroleum fractions, Part 1 ... Dec. 101

DRYING
Guidelines for glycol dehydrator design, Part 1 ... Jan. 107
Guidelines for glycol dehydrator design, Part 2 ... Feb. 87

E

ELASTOMERS
Etherify field butanes, Part 1 ... Jan. 89
Etherify field butanes, Part 2 ... Feb. 43
Etherify light gasolines ... Feb. 53

ENVIRONMENT
How CAA impacts polymer processing ... Feb. 95
Fluidized bed incineration: improved waste disposal method ... Mar. 61
How to prepare a successful operating permit ... Apr. 95
When is part substitution okay? ... May 101
Residual fuels in a clean-fuels environment ... Jun. 82B
Retrofit methods reduce valves' fugitive emissions ... Jun. 97
Reduce oil and grease content in wastewater ... Jun. 102
Partnership programs can solve environmental waste problems ... Jul. 90
Europe's refiners face new horizons ... Jul. 92C
Reduce crude unit pollution with these technologies ... Aug. 45
Energy absorption probes control oily-water discharges ... Aug. 55
Risk assessment alleviates environmental liabilities ... Aug. 61
Environmental processes '93 ... Aug. 67
Approximate risk assessment prioritizes remedial decisions ... Aug. 111
Underground storage tank: removal vs. abandonment ... Aug. 149
How to set up an environmental audit program ... Sep. 55
Proven technologies manage olefin plant's spent caustic ... Sep. 61
Performing capital projects in ozone nonattainment areas ... Sep. 76C
New valve packing technology extends service life ... Oct. 105
Recognize and advertise environmental success ... Oct. 139
How to justify water conservation projects ... Dec. 65
Improve storm water management for refineries, Part 1 ... Dec. 73
Design more flexibility into wastewater treatment ... Dec. 81

EQUIPMENT
Streamline fast-track projects ... May 116C

ETHERS
Etherify field butanes, Part 1 ... Jan. 89
Etherify field butanes, Part 2 ... Feb. 43
Etherify light gasolines ... Feb. 53

ETHYLENE
Are there contaminants in your feedstream? ... Jan. 117

F

FLOW PROPERTIES
FCC main fractionator revamps ... Mar. 77
Predict octane number for gasoline blends ... May 85

FORECASTING
Forecasting oil trends: mirror or telescope? ... Nov. 148J

G

GLYCOLS
Guidelines for glycol dehydrator design, Part 1 ... Jan. 107
Guidelines for glycol dehydrator design, Part 2 ... Feb. 87

H

HEAT TRANSFER
Consider pump cast refractory for critical linings ... Jan. 55
Consider insulation reliability ... Jan. 73
Etherify light gasolines ... Feb. 53
Vibration effects of two-phase cross flow on heat exchangers ... Mar. 53
FCC main fractionator revamps ... Mar. 77
Selecting gas turbines for power cogeneration ... Mar. 115
How to design baffle tray columns ... May 75
Troubleshoot vacuum columns with low-capital methods ... Jul. 81
Use Ponchon-Savarit in your process simulation, Part 1 ... Sep. 41
Distillation feed preheat—is it energy efficient? ... Oct. 37
BASIC program calculates flue gas energy balance ... Oct. 47
Optimize thermal insulation ... Oct. 51
Erratum ... *Dec.* 39
Use ceramic coatings to improve efficiency of gas-fired furnaces ... Oct. 59
Use Ponchon-Savarit in your process simulation, Part 2 ... Oct. 63
Revamping FCC main fractionator energy systems ... Nov. 43
Improve heat exchanger leak detection ... Nov. 85
How to justify water conservation projects ... Dec. 65

HYDROCRACKING
Cogeneration refinery for total residue destruction ... Nov. 52
Bottom-of-the-barrel upgrading moves aggressively ... Dec. 100C

HYDROGEN
Generate hydrogen for reformulated gasoline and clean diesel requirements ..... Jan. 77
Improve methanol synthesis ... Mar. 89
Hydrogen membrane recovery estimates ..... Apr. 61
Residual fuels in a clean-fuels environment ..... Jun. 82B
Bottom-of-the-barrel upgrading moves aggressively ..... Dec. 100C

HYDROGENATION
Industrial hydrogenation of aldehydes ..... Mar. 67
Hydrotreating catalysts for diesel aromatics saturation ..... Jun. 83

HYDROTREATING
Hydrotreating catalysts for diesel aromatics saturation ..... Jun. 83
Cogeneration refinery for total residue destruction ..... Nov. 52
Bottom-of-the-barrel upgrading moves aggressively ..... Dec. 100C

I

INCINERATION
Fluidized bed incineration: improved waste disposal method ..... Mar. 61
Proven technologies manage olefin plant's spent caustic ..... Sep. 61

INSTRUMENTATION
Improve process analyzer availability ..... Jan. 69
Safety system performance terms: clearing up the confusion ..... Feb. 63
Erratum ..... *Dec. 35*
Selecting redundant microprocessor-based systems ..... Feb. 71
Include heuristics in protection systems ..... Feb. 79
FCC main fractionator revamps ..... Mar. 77
Improve machinery vibration data ..... Mar. 94
Protect motors with solid-state overloads ..... Mar. 100
On-line octane control with NIR analyzers ..... Mar. 103
Consider adaptive multivariable predictive controllers ..... Mar. 109
On-line optimal NGL recovery in lean oil plants ..... Apr. 55
FCCU advanced control and optimization ..... Apr. 107
Information system master planning ..... May 45
Manage plant modernization projects 'humanistically' ..... May 55
Computer integrated manufacturing/processing in the HPI ..... May 65
How to justify small-refinery info/control system modernization ..... May 69
When is part substitution okay? ..... May 101
Improve planetary gear vibration analysis ..... May 105
Polyethylene reactor modeling and control design ..... Jun. 119
Manage costs in real time ..... Jul. 41
Simplify fuzzy controller implementation ..... Jul. 49
Assessing your competitors' application of CIM/CIP ..... Jul. 57
Benefits of standardized advanced controls ..... Jul. 63
Process optimization in the HPI ..... Jul. 69
Energy absorption probes control oily-water discharges ..... Aug. 55
Heavy oil viscosity range from one test ..... Aug. 157
Delayed coker fractionator advanced control ..... Aug. 173
Predict AGO quality ..... Sep. 47
Advanced process control strategies '93 ..... Sep. 77
Take an integrated approach to refinery automation ..... Sep. 155
Improve prediction with data reconciliation ..... Oct. 79
RCU optimization in a DCS gives fast payback ..... Oct. 85
Integrate offsites management with information systems .... Nov. 63
Improve heat exchanger leak detection ..... Nov. 85
Improve plant performance with automation studies ..... Nov. 103
Fieldbus: How a worldwide standard will benefit the HPI ..... Dec. 107

ISOBUTANE
Etherify light gasolines ..... Feb. 53

ISOBUTENE see OLEFINS

ISOMERIZATION
Etherify field butanes, Part 1 ... Jan. 89
Etherify field butanes, Part 2 ... Feb. 43
Etherify light gasolines ..... Feb. 53

L

LIQUEFIED NATURAL GAS (LNG)
On-line optimal NGL recovery in lean oil plants ..... Apr. 55

LIQUEFIED PETROLEUM GAS (LPG)
Understanding corrosion in alkanolamine gas treating plants, Part 1 ..... Apr. 75
Understanding corrosion in alkanolamine gas treating plants, Part 2 ..... May 89

LOSS PREVENTION
Are there contaminants in your feedstream? ..... Jan. 117
Use 'What-If' method for process hazard analysis ..... Jan. 132B
Erratum ..... *Apr. 50*
Safety system performance terms: clearing up the confusion ..... Feb. 63
Erratum ..... *Dec. 35*
Selecting redundant microprocessor-based systems ..... Feb. 71
Include heuristics in protection systems ..... Feb. 79
Do you have the 'right' flame arrester in service? ..... Feb. 99
Erratum ..... *Apr. 123*
Protect motors with solid-state overloads ..... Mar. 100
FMEA, the alternative process hazard method ..... May 95
Organizations have no memory when it comes to safety ..... Jun. 88
Retrofit methods reduce valves' fugitive emissions ... Jun. 97
Partnership programs can solve environmental waste problems ..... Jul. 90
How to shop for a PSM consultant ..... Jul. 95
Reduce crude unit pollution with these technologies ..... Aug. 45
Energy absorption probes control oily-water discharges ..... Aug. 55
Approximate risk assessment prioritizes remedial decisions ..... Aug. 111
Improve your safety program with a behavioral approach ..... Aug. 119
Quantitative reliability methods improve plant uptime ..... Aug. 131
Underground storage tank: removal vs. abandonment ... Aug. 149
How to set up an environmental audit program ..... Sep. 55
Modeling of tower relief dynamics, Part 1 ..... Oct. 71
How to prioritize process hazard analyses ..... Oct. 95
Modeling of tower relief dynamics, Part 2 ..... Nov. 69
Statistical safety factors reduce overdesign ..... Nov. 77
Improve heat exchanger leak detection ..... Nov. 85
How to calculate purge gas volumes ..... Nov. 89
How to justify water conservation projects ..... Dec. 65
Improve storm water management for refineries, Part 1 ..... Dec. 73
Design more flexibility into wastewater treatment ..... Dec. 81
Improve suspended water removal from fuels ..... Dec. 95

M

MAINTENANCE
Apply reliability centered maintenance to sealless pumps ..... Jan. 43
Specifying clad CRA piping ... Jan. 51
Erratum ..... *Mar. 51*
Consider pump cast refractory for critical linings ..... Jan. 55
Improve relief valve reliability ..... Jan. 59
Erratum ..... *Mar. 50*
Improve process analyzer availability ..... Jan. 69
Consider insulation reliability ..... Jan. 73
Use a simple color code for maintenance priorities ... Feb. 116D
Improve machinery vibration data ..... Mar. 94
Protect motors with solid-state overloads ..... Mar. 100
When to maintain centrifugal pumps ..... Apr. 101
Improve planetary gear vibration analysis ..... May 105

Factors affecting reciprocating compressor performance ... Jun. 57
Improve maintenance reliability ... Aug. 162C
Monitor lube-oil quality in service ... Aug. 171

MANAGEMENT
Use 'What-If' method for process hazard analysis ... Jan. 132B
Erratum ... *Apr. 50*
Plan for constructability, Part 1 ... Jan. 135
Erratum ... *Apr. 49*
Use a simple color code for maintenance priorities ... Feb. 116D
Plan for constructability, Part 2 ... Feb. 151
Create better construction subcontract bid packages ... Mar. 102J
The power of nonverbal communication ... Mar. 142
When you joint-venture overseas ... Apr. 124D
A common sense approach to quality management ... Apr. 143
Manage plant modernization projects 'humanistically' ... May 55
Computer integrated manufacturing/processing in the HPI ... May 65
Streamline fast-track projects ... May 116C
How to accomplish more, Part 1 ... May 124
Erratum ... *Dec. 37*
Residual fuels in a clean-fuels environment ... Jun. 82B
Organizations have no memory when it comes to safety ... Jun. 88
How to accomplish more, Part 2 ... Jun. 189
Europe's refiners face new horizons ... Jul. 92C
Is a bad temper hurting your career? ... Jul. 116
Improve maintenance reliability ... Aug. 162C
ISO 9000: Back to basics ... Aug. 197
Erratum ... *Dec. 35*
How to set up an environmental audit program ... Sep. 55
Performing capital projects in ozone nonattainment areas ... Sep. 76C
Systems integration: What is it and why do it? ... Sep. 151
Improve productivity through effective teamwork ... Sep. 173
Attain ISO-9000 certification ... Oct. 82B
Recognize and advertise environmental success ... Oct. 139
Forecasting oil trends: mirror or telescope? ... Nov. 148J
Employees feel 'empowered' ... Nov. 155
Views from 1993 ECC conference ... Dec. 41
TQM can improve project control ... Dec. 44
Project-manage the owner/client ... Dec. 49
New realities of modular construction ... Dec. 57

METALS
Specifying clad CRA piping ... Jan. 51
Erratum ... *Mar. 51*
Avoid H_2S corrosion in refinery vessels ... Jan. 103
Improve methanol synthesis ... Mar. 89

MOLECULAR SIEVES
Sour natural gas drying ... Apr. 67

MOTORS
Protect motors with solid-state overloads ... Mar. 100

N

NATURAL GASES see also LIQUEFIED NATURAL GAS
Guidelines for glycol dehydrator design, Part 1 ... Jan. 107
Guidelines for glycol dehydrator design, Part 2 ... Feb. 87
Understanding corrosion in alkanolamine gas treating plants, Part 2 ... May 89

O

OCTANE NUMBER see ANTIKNOCK RATING

OLEFINS
Etherify field butanes, Part 1 ... Jan. 89
Are there contaminants in your feedstream? ... Jan. 117
Etherify field butanes, Part 2 ... Feb. 43
Etherify light gasolines ... Feb. 53
Industrial hydrogenation of aldehydes ... Mar. 67
Proven technologies manage olefin plant's spent caustic ... Sep. 61

OXIDATION
Proven technologies manage olefin plant's spent caustic ... Sep. 61

P

PARTIAL OXIDATION
Generate hydrogen for reformulated gasoline and clean diesel requirements ... Jan. 77

PIPING
Specifying clad CRA piping ... Jan. 51
Erratum ... *Mar. 51*
How to calculate optimum pipe size for liquids ... Jun. 67
Consider quarter-turn gates for gate valve applications ... Jun. 78
Optimize thermal insulation ... Oct. 51
Erratum ... *Dec. 39*

PROPERTY DATA
Predict octane number for gasoline blends ... May 85

PUMPS
Apply reliability centered maintenance to sealless pumps ... Jan. 43
FCC main fractionator revamps ... Mar. 77
Overview of the new sealless pump standard ... Jun. 49
Implications of the new pump shaft sealing standard ... Jun. 53
Rate pumps for viscous crudes quickly ... Nov. 94
Erratum ... *Dec. 39*

R

REFORMING
Generate hydrogen for reformulated gasoline and clean diesel requirements ... Jan. 77
Improve methanol synthesis ... Mar. 89
Reforming using erionite catalysts ... Aug. 165

REFORMULATION
Generate hydrogen for reformulated gasoline and clean diesel requirements ... Jan. 77

RESIDUES
Recover additional distillate from vacuum residue ... Jul. 75
Cogeneration refinery for total residue destruction ... Nov. 52

ROTATING EQUIPMENT
When to maintain centrifugal pumps ... Apr. 101
Improve planetary gear vibration analysis ... May 105
Factors affecting reciprocating compressor performance ... Jun. 57
Monitor lube-oil quality in service ... Aug. 171
Rate pumps for viscous crudes quickly ... Nov. 94
Erratum ... *Dec. 39*

S

SOFTWARE
Improve process analyzer availability ... Jan. 69
Include heuristics in protection systems ... Feb. 79
BASIC program calculates flue gas energy balance ... Oct. 47

SULFUR
Improve methanol synthesis ... Mar. 89
Sour natural gas drying ... Apr. 67
Residual fuels in a clean-fuels environment ... Jun. 82B

SYNTHESIS GAS see also HYDROGEN; PARTIAL OXIDATION; REFORMING
Generate hydrogen for reformulated gasoline and clean diesel requirements ... Jan. 77

T

TRAINING
A common sense approach to quality management ... Apr. 143

TREATING
Residual fuels in a clean-fuels environment ... Jun. 82B
Hydrotreating catalysts for diesel aromatics saturation ... Jun. 83
Cogeneration refinery for total residue destruction ... Nov. 52

TURBINES
Selecting gas turbines for power cogeneration ... Mar. 115

U

UTILITIES
Cogeneration refinery for total residue destruction ... Nov. 52

How to justify water conservation projects ..... Dec. 65
Improve storm water management for refineries, Part 1 ..... Dec. 73
Design more flexibility into wastewater treatment ..... Dec. 81
Bottom-of-the-barrel upgrading moves aggressively ..... Dec. 100C

V

VACUUM
Recover additional distillate from vacuum residue ..... Jul. 75

VALVES
Improve relief valve reliability ..... Jan. 59
Erratum ..... *Mar.* *50*
When is part substitution okay? ..... May 101
Consider quarter-turn gates for gate valve applications ... Jun. 78
Retrofit methods reduce valves' fugitive emissions ... Jun. 97
Modeling of tower relief dynamics, Part 1 ..... Oct. 71
New valve packing technology extends service life ..... Oct. 105
Modeling of tower relief dynamics, Part 2 ..... Nov. 69

VESSELS
Avoid H_2S corrosion in refinery vessels ..... Jan. 103
How to design baffle tray columns ..... May 75
Recover additional distillate from vacuum residue ..... Jul. 75
Troubleshoot vacuum columns with low-capital methods ... Jul. 81
Underground storage tank: removal vs. abandonment .. Aug. 149
Use Ponchon-Savarit in your process simulation, Part 1 ..... Sep. 41
Predict AGO quality ..... Sep. 47
Distillation feed preheat—is it energy efficient? ..... Oct. 37
Use Ponchon-Savarit in your process simulation, Part 2 ..... Oct. 63
Modeling of tower relief dynamics, Part 1 ..... Oct. 71
Increasing FCC regenerator catalyst level ..... Nov. 59
Modeling of tower relief dynamics, Part 2 ..... Nov. 69
How to calculate purge gas volumes ..... Nov. 89

VIBRATION
Vibration effects of two-phase cross flow on heat exchangers ..... Mar. 53

VISCOSITY
Heavy oil viscosity range from one test ..... Aug. 157

W

WASTEWATER
Reduce oil and grease content in wastewater ..... Jun. 102
Proven technologies manage olefin plant's spent caustic ..... Sep. 61
How to justify water conservation projects ..... Dec. 65
Improve storm water management for refineries, Part 1 ..... Dec. 73

Authors

A

Abbott, K. W. ..... Dec. 44
Abrardo, J. M. ..... Jan. 77
Agar, G. ..... Aug. 55
Aitani, A. M. ..... Apr. 67

B

Baade, W. F. ..... Jan. 77
Bacon, T. R. ..... Apr. 75
Baker, T. R. ..... May 89
Ballard, D. ..... May 124
Jun. 189
Barrett, E. J. ..... Jun. 82B
Bashir, M. D. ..... May 85
Bearrow, M. E. ..... Jul. 95
Oct. 95
Beckman, L. V. ..... Feb. 71
Bell, M. ..... Jun. 119
Bergmann, E. P. ..... Aug. 111
Berkowitz, P. N. ..... Apr. 55
Biasca, F. E. ..... Dec. 100C
Bishop, K. ..... Feb. 99
Black, R. E. ..... Jul. 90
Borruso, A. V. ..... Apr. 124D
Bradford, M. L. ..... Mar. 61
Jun. 102
Dec. 81
Brown, Jr., R. L. ..... Dec. 95
Brush, P. ..... Sep. 76C
Bryant, G. B. ..... Oct. 59
Buck, G. S. ..... Jun. 53

C

Callahan, B. ..... Aug. 61
Campagne, W. v. L. ..... Sep. 41
Oct. 63
Capps, R. W. ..... Jun. 102
Nov. 77
Dec. 81
Cassata, J. R. ..... Oct. 71
Nov. 69
Castells, F. ..... Dec. 101
Chan, A. M. C. ..... Mar. 53
Chieu, J. ..... Dec. 73
Christie, D. A. ..... Nov. 103
Cindric, D. T. ..... Aug. 45
Cleary, J. A. ..... Jun. 49
Clewis, P. ..... Aug. 55
Coonan, T. ..... May 55
Cooper, B. H. ..... Jun. 83

D

Dailey, W. V. ..... Jan. 69
Dana, C. ..... Jun. 78
Dasgupta, S. ..... Oct. 71
Nov. 69
Davidse, G. J. ..... Jan. 55
de Tremblay, M. ..... Jun. 119
Dickenson, R. L. ..... Dec. 100C
Doane, R. C. ..... Nov. 94
Dollar, R. ..... Mar. 109
Dougan, K. W. ..... Aug. 131
Dragoo, R. E. ..... Jul. 41
DuPart, M. S. ..... Apr. 75
May 89
Dupuis, G. E. ..... Apr. 61
Duty, J. M. ..... Dec. 57

E

Early, Jr., P. L. ..... Dec. 107
Edwards, D. J. ..... Apr. 75
May 89
El Sherif, A. H. ..... Aug. 171
Esping, J. ..... Jan. 132B
Evans, H. N. ..... Jul. 57

F

Fair, J. R. ..... May 75
Farina, G. L. ..... Nov. 52
Felten, J. R. ..... Jun. 82B
Fisher, D. ..... Dec. 57
Fleming, B. ..... Nov. 43
Fleming, G. K. ..... Apr. 61
Fontana, M. ..... Nov. 52
Forsell, K. A. ..... Mar. 100
Foster, S. ..... Dec. 73
Funk, G. L. ..... Sep. 151

G

Gallupe, W. ..... Jun. 97
Gamboa, R. ..... Jan. 73
Gamez, J. P. ..... Apr. 55
Ganapathy, V. ..... Feb. 93
Oct. 47
Gandhi, S. L. ..... Oct. 71
Nov. 69
Ganger, J. J. ..... Oct. 95
Gentry, A. R. ..... Aug. 45
Giorno, C. ..... May 116C
Glasgow, D. T. ..... Mar. 109
Goldblatt, M. ..... Dec. 65
Golden, S. W. ..... Mar. 77
Jul. 81
Nov. 43
Gomaa, H. M. ..... Aug. 45
Sep. 61
Goodale, J. G. ..... Sep. 173
Goyal, R. K. ..... May 95
Grover, R. ..... Sep. 61
Gruhn, P. ..... Feb. 63

H

Hall, J. ..... Oct. 85
Hanisch, J. L. ..... Apr. 95
Hannerup, P. N. ..... Jun. 83
Haq, I. ..... Mar. 94
Harkins, B. L. ..... Jul. 63
Hartlen, D. ..... Jun. 119
Haskins, D. E. ..... May 69
Hellander, J. C. ..... Oct. 59
Hill, J. ..... Sep. 76C
Hoffnagle, G. F. ..... Apr. 95
Hussain, M. S. ..... May 105

J

Jackson, R. ..... Oct. 105
Jaisinghani, R. ..... Aug. 173
Janosfia, A. S. ..... Jul. 75
Johnson, H. E. ..... Dec. 100C
Johnson, R. L. ..... Jul. 90

K

Karassik, I. J. ..... Apr. 101
Kawaji, M. ..... Mar. 53
Kerridge, A. E. ..... Jan. 135
Feb. 151
Dec. 49
King, M. J. ..... Jul. 57
Klein, B. ..... Aug. 45
Kletz, T. A. ..... Jun. 88
Knittel, T. ..... Feb. 99
Kobyakov, A. I. ..... Feb. 79
Kopple, L. B. ..... May 45

L

Ladebeck, J. ..... Mar. 89
Laxton, G. ..... Nov. 85
Leibovici, C. F. ..... Oct. 79
Leonard, S. C. ..... Aug. 162C
Letendre, R. ..... Jul. 41
Lewis, W. W. ..... Dec. 57
Lian, H. Y. ..... Mar. 53
Lichtblau, J. H. ..... Nov. 148J
Lieberman, E. T. ..... Jul. 81

Lieberman, N. P. ..... Jul. 81
Liebert, T. C. ..... Oct. 37
Liers, J. ..... Aug. 165
Lin, T. D. V. ..... Apr. 107
Lines, B. ..... Jun. 119
Loftus, D. ..... Jul. 90
Love, R. A. ..... Oct. 82B
Ludwig, G. H. ..... Mar. 67

M

Manning, W. P. ..... Jan. 107
Feb. 87
Martin, G. R. ..... Mar. 77
Martinson, B. ..... Sep. 55
Matelli, G. N. ..... Jun. 102
Dec. 81
McCarthy, K. M. ..... Jun. 82B
McCaw, P. A. ..... Aug. 61
McSween, T. E. ..... Aug. 119
Mehta, B. P. S. ..... Oct. 51
Melton, L. L. ..... Mar. 109
Meusinger, J. ..... Aug. 165
Miadonye, A. ..... Aug. 157
Miller, J. ..... Dec. 107
Miller, M. ..... Oct. 105
Minter, B. ..... Aug. 173
Miquel, J. ..... Dec. 101
Morshedi, A. M. ..... Mar. 109
Mosch, A. ..... Aug. 165
Mullah, S. A. ..... May 85

N

Nelson, W. E. ..... Jan. 59

O

O'Hearne, M. D. ..... Jul. 63
Ojeda, R. ..... Aug. 173
Okasinski, M. ..... Feb. 95

P

Papadopoulos, M. N. ..... Apr. 55
Paquin, F. D. ..... Jun. 119
Patel, M. R. ..... Oct. 51
Pattee, D. ..... Feb. 95
Pelham, R. O. ..... Jul. 69
Pescarollo, E. ..... Feb. 53
Petchonka, J. ..... Feb. 95
Peters, C. ..... Jul. 90
Peterson, J. R. ..... Jan. 55
Politzer, B. A. ..... Mar. 103
Portal, G. M. A. ..... Jul. 92C
Pradhan, S. ..... Jan. 43
Pugh, T. ..... Nov. 85
Puglesi, A. ..... Aug. 173
Puttagunta, V. R. ..... Aug. 157

Q

Quernemoen, B. L. ..... May 101

R

Ralston, P. A. S. ..... Jul. 49
Ramaganesan, S. ..... Jul. 49
Ramharry, W. ..... Jan. 117
Raudsepp, E. ..... Mar. 142
Jul. 116
Reilly, M. C. ..... Aug. 131
Repsher, K. W. ..... Mar. 109
Reschetilowski, W. ..... Aug. 165
Riddle, A. L. ..... Oct. 139
Roberson, C. G. ..... Jul. 63
Roberts, D. A. ..... Jul. 75
Robinson, J. E. ..... Aug. 149
Roy, G. K. ..... Mar. 115

S

Sadhukhan, P. ..... Mar. 61
Sarathy, P. R. ..... Jan. 89
Feb. 43
Feb. 53
Schneider, D. F. ..... Nov. 89
Schulman, B. L. ..... Dec. 100C
Schwinn, V. ..... Jan. 103
Simola, F. ..... Sep. 47
Simpson, G. D. ..... Nov. 85
Singh, B. ..... Jan. 51
Aug. 157
Sloley, A. W. ..... Mar. 77
Nov. 43
Snyder, G. D. ..... Jan. 77
Spencer, C. ..... Aug. 55
Stanislaus, A. ..... Jun. 83
Stoll, K. E. ..... Jul. 49
Streisselberger, A. ..... Jan. 103
Strobhar, D. ..... May 55
Suffridge, G. S. ..... Jan. 89
Feb. 43

T

Tagoe, C. ..... Jan. 117
Tarzia, T. ..... Sep. 47
Thompson, J. R. ..... Nov. 77
Thorman, G. O. ..... Feb. 116D
Tica, A. ..... Aug. 173
Treiber, S. ..... Jun. 119
Trotta, R. ..... Feb. 53

U

Unruh, C. ..... Feb. 116D
Urban, R. M. ..... Mar. 102J

V

Valleur, M. ..... Nov. 63
van der Piepen, R. ..... Jul. 75
Verne, T. ..... Oct. 85
Verneuil, Jr., V. S. ..... Oct. 79
Vervalin, C. H. ..... Dec. 41
Visigalli, R. ..... Sep. 47

W

Wadi, I. ..... Sep. 155
Walata III, S. ..... Apr. 95
Weightman, R. T. ..... Aug. 197
West, J. ..... Nov. 155
Wines, T. H. ..... Dec. 95
Winston, R. E. ..... Dec. 132
Wong, R. F. ..... Nov. 59
Wood, H. S. ..... Jan. 107
Feb. 87
Woodruff, D. M. ..... Apr. 143
Woollatt, D. ..... Jun. 57

Y

Yang, P. ..... Oct. 79
York, B. ..... Nov. 85
Yoshimura, J. S. ..... May 65
Yu, F. C. ..... Jun. 67

Z

Zahed, A. H. ..... May 85
Zetter, M. S. ..... Mar. 103
Zoller, L. ..... Jan. 132B

Page number with letter suffix notes International edition only.

For copies of articles, write: Reprint Dept., *Hydrocarbon Processing*, P.O. Box 2608, Houston, Texas 77252, U.S.A.

For extra copies of this index or previous index, write: Library, Gulf Publishing Company, P.O. Box 2608, Houston, Texas 77252, U.S.A.

Hydrocarbon Processing

Ray D. Cashman, Publisher
Robert W. Scott, Editorial Director
Dr. John J. McKetta, Jr., Chairman, Editorial Committee
Charles H. Vervalin, Editor
Les A. Kane, Engineering Editor
Stephany Romanow-Garcia, Senior Process Editor
David N. Nakamura, Process Editor
LeAnn Dunn, Associate Editor
Laura Riddle, Boxscore Coordinator
Marcia Roberson, Assistant Boxscore Coordinator
Heinz P. Bloch, Contributing Editor

EDITORIAL PRODUCTION
Jack Cockerham, Senior Editorial Production Director
Henry D. Terrell, Magazine Production Director
Chris Jones, Electronic Production Specialist
Crista Redden, Editorial Production Manager
Susan P. Lee, Editorial Production Assistant
Mohammed Samiuddin, Art Director
David Weeks, Staff Artist

ABP

The Audit Bureau Member

GULF PUBLISHING COMPANY

Editorial and Executive Offices, 3301 Allen Parkway, Houston, Texas 77019. Mailing Address: PO Box 2608, Houston, Texas 77252-2608, U.S.A. Cable Address: GULFPUBCO HOUSTON. Telex: 287330 GULF UR
Phone: (713) 529-4301. FAX: (713) 520-4433

Ray Dudley Cashman, Chairman and President
Margaret D. Cashman, Vice Chairman
Sam S. Sorrell, Executive Vice President
Clayton A. Umbach, Vice President
Robert W. Scott, Vice President
Barba Willman, Secretary/Treasurer
Robert D. Dudley, Business Manager

ADVERTISING
Gene Swantek, Associate Publisher, Marketing
Eric Freer, Advertising Production Manager

For addresses of advertising sales offices, see the Advertisers' Index.

SUBSCRIPTIONS
Joseph R. Mullins, Circulation Manager

Subscription price: United States, Canada, and Latin America, one year $20, two years $35, three years $45. All other countries, one year $32.50, two years $56.25, three years $71.25. Airmail rate in North America $85 a year; Outside North America $175 a year. Single copies $10, prepaid.

Because *Hydrocarbon Processing* is edited specifically to be of greatest value to people working in this specialized business, subscriptions are restricted to those engaged in the hydrocarbon processing industry, or service and supply company personnel connected thereto.

Copyright ©1993 by Gulf Publishing Co. All rights reserved.

Hydrocarbon Processing is indexed by Applied Science & Technology Index, by Chemical Abstracts and by Engineering Index Inc. Microfilm copies available through University Microfilms, International, Ann Arbor, Mich.

GULF PUBLISHING CO. PUBLICATIONS
Hydrocarbon Processing® for the hydrocarbon processing industry. **World Oil®** (formerly **The Oil Weekly**) and **Composite Catalog®** for the drilling-producing industry. **Pipe Line Industry®** for pipe lines and gas distribution.

Printed in the U.S.A.